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Art. I. *On those Principles of Composition, in Architecture, which are common to all the Fine Arts.* By the Conductor.

The principles of composition in any art must necessarily depend upon the end which that art is intended to effect. The objects of architecture may be reduced to three; utility, durability, and beauty. The principle of utility determines the situation, dimensions, arrangement, and local relations of buildings; that of durability, the mode of their construction, and the nature of their materials; and that of beauty, their appearance as objects of taste. The first two of these objects we shall pass over for the present, as being, from their practical and mechanical nature, much more generally understood than the latter; and we shall, therefore, limit our observations, in this and some succeeding articles, to the principles of composition in architecture, with reference to the production of beauty.

Beauty in architecture, as in other arts, and as in nature, is of many kinds; but in architecture all these kinds may be included in two classes: first, those kinds of beauty which result from a combination of what may be called the elementary materials of architecture as a fine art, without reference to the works of preceding artists; and, secondly, those which result from architectural combinations which have reference to the works of preceding artists.

The elementary materials of architecture, considered as an art of taste, are forms, lines, lights, shades, and colours. The principal element, however, is form, which may be said to give rise to lines, lights and shades, and, to a certain extent also, even to colours.

The elements of architecture, considered as an art established by preceding artists, are to be found in the elementary forms of the different styles of building; such as the Grecian, the Gothic, &c., with all their numerous varieties and subvarieties. We shall confine ourselves, in this article, to those fundamental principles of composition which apply to architecture, in common with all the fine arts.

The first principle in all combinations, whether of lines, forms,

colours, or sounds, is that of producing *a whole*. The reason why this is a fundamental principle is, that the mind can only attend to one sensation at one time; and hence, that where more objects than one are presented to it, they must be so presented as to produce only a single sensation. A single sensation, produced by a number of objects, may be called a composite sensation, as opposed to a simple sensation, or one produced by a single object. For example, a hundred bricks, if strewed promiscuously over a piece of ground, could only be looked at separately one after another, and would therefore produce a hundred separate sensations: but, if these bricks were thrown together in a heap, they might be observed by one glance of the eye; and in that case would produce only one single sensation or impression on the mind. If the heap were large, and the spectator placed so near it as that he could not see the whole at one glance, he would then experience a confusion of sensations; because he would see those bricks which were near the eye individually, and others, farther from it, in parts; without, however, being able to see the heap as a whole. This example illustrates two subordinate principles in the formation of a whole; that of *contiguity*, or the necessity of bringing those parts which compose the whole in contact; and that of *distance*, or the necessity of adjusting the dimensions of the object, or its distance from the spectator, to the powers of vision in the human eye.

If we suppose the heap of bricks to be at such a distance from the eye as to be taken in at a glance, and consequently easily comprehended as a single object; and if we further suppose it to be in the form of a cone, or a pyramid; this will give an additional idea or sensation: but even this additional sensation may be still easily included in the one composite sensation produced by the whole. We may next suppose the pyramid arranged like steps; this will not interfere with the idea of a whole, though it will add still farther to the composite nature of the sensation produced by it. If we suppose these steps alternately of white and black marble, the object may still be viewed as a whole; but if the lower half of the pyramid were to be of steps of one colour, and the upper half of steps of another colour; or if the lower half were arranged in steps, and the upper half without steps, then the mind would receive two distinct sensations, that produced by the lower half, and that by the upper half; and these two sensations would no longer unite in forming a composite sensation of easy comprehension; that is, in forming a whole. From these particulars, two conclusions relative to the composition of a whole may be deduced: first, that a great number of simple sensations may enter into the idea of it; and, secondly, that all these simple sensations must unite in forming one composite sensation. Thus we arrive at two familiar prin-

ciples, viz., that of *the necessity of the unity of the whole*, and that of *the necessity of the connection of the parts which compose it.*

That the human mind is adapted for viewing, as a whole, an indefinite number of parts, may be rendered evident to every reader, by his considering the number of particulars that enter into the composite idea of the meaning of a written or printed sentence; say of one thousand letters, in a hundred words. In casting the eye rapidly over such a sentence, the meaning is caught at once; but it can only be caught in consequence of each of the thousand letters in that sentence having produced its separate simple sensation; each of the separate words having also produced its separate composite sensation; and each of the members of the proposition, or subject of the sentence, having also produced its composite sensation.

We may here mention, incidentally, that in this way what is called the association of ideas may be formed: the sight of a letter leads to the idea of words and sentences; and the sound of a word leads to the idea of its separate letters. The view of a single brick raises up in the mind the idea of a wall or a house; and a house calls up in the mind the idea of the bricks, and of all the other component parts of which it is constructed. It is, in many cases, by the exercise of the mind in tracing these associations, that the emotion of beauty is experienced; and this emotion of beauty is to be considered as the result of a composite sensation, in the same way as what may be called a sensation of beauty is produced by a single sensation, from viewing any agreeable form or colour.

On looking at any pleasing object, whether in nature or in art, it will always be found, on analysing it, that, whether it be merely agreeable, or supremely beautiful, it still forms a whole: this quality of forming a whole being independent of every other description of beauty, and yet being common to all the different kinds of it. On the other hand, no composition whatever, though its parts, when taken separately, may each be of the greatest beauty, will please when these parts are put together, unless in that state they form a whole. Parts, also, which, if viewed separately, have little or no beauty, may, when combined in due subordination to the principle of unity, form a beautiful whole. A multitude of objects enter into the composition of those landscapes which include a considerable portion of distant scenery. Many of these objects, taken separately, may not only be of little beauty, but may be disagreeable, or even deformed; yet some one principle, by operating alike on this immense number of seemingly discordant particulars or sensations, reduces them all to one agreeable composite sensation. This principle, in the background of a natural landscape, is distance; and, in the foreground of a natural landscape, is continuous light, or

continuous shade. In like manner, all discordant compositions may be rendered accordant, if not positively beautiful, by some uniting principle which may be applied in common to all their parts. The whole of a discordant landscape may be reduced to unity of expression, by increasing the distance of the picture from the eye, by excess of either light or shade being thrown over every part of it, or by sameness of colouring; and a house, or other building, which, in respect to its forms, its lines, or its style, is discordant, may be rendered tolerable, by being whitewashed in every part, or by being stained in every part with dark tints, so as to give the whole an appearance of age and antiquity. We are far from saying that by processes of this kind beauty can be produced; we only assert that discordant parts may be reduced to a whole, and that deformity may be neutralised, and thus rendered accordant, or at least tolerable. Our object, in stating these things so much in detail, is, if possible, to convey to every reader an idea of the paramount necessity of the principle of a whole pervading every composition whatever. We shall next proceed to develope other principles.

Every work of art, to give pleasure to the human mind as such, must be recognised as a work of art. This is self-evident. If it were possible for an artist to form imitations of trees, stones, rocks, ground, or animals, all so perfect as to be undistinguishable from similar productions of nature, they would be considered as natural objects: and, consequently, whatever gratification they might otherwise afford, they could give no pleasure as works of art; since, as before observed, to enable them to do so, it must be known that they were formed by the hand of man. The heap of bricks, before referred to, was recognisable as a work of art, from the artificial forms of the bricks: had the forms of which this heap was composed been natural, such as small stones, gravel, or lumps of earth, unless the shape of the heap had approached to some regular geometrical or artificial form, it would not have been recognisable as a work of art, and could have given no pleasure as such. The recognition of art, therefore, is a primary principle in architecture, as, indeed, it is in all the fine arts, even in those which are considered the most purely imitative. Hence it is that the irregular style of landscape-gardening, as described or treated by some who seem to consider it a mere imitation of natural scenery, is, in so far as it perfectly attains such an end, no fine art at all. How, indeed, can there be any art in that work which, when in its perfect state, must necessarily be mistaken for nature? Landscape-gardening is, doubtless, like architecture, to a certain extent, a fine art; but not by virtue of its creating fac-similes of natural scenery. No work of man can rank as a fine art, in the composition of which the recognition of art is not a fundamental principle. How this

is to be effected, in the imitation of natural scenery by landscape-gardening, is suggested in *Gard. Mag.*, viii. 701. and ix. 682.; and will be developed, in all its details, in our *Encyclopædia of Landscape-Gardening.*

The next principle which we shall notice, as generally applicable to the fine arts, is *regularity*, or the recognition of regular art. A hut may be recognised as a work of art, however rude or anomalous its form; because, according to human experience, its sides, its roof, and its door could never have been arranged, so as to form a hut, by chance. Such a hut is satisfactory as a work of art, but nothing more: but a hut in a square form gives additional satisfaction by the regularity of its figure; which gives an idea not only of art, but of cultivated or improved art. There can be no doubt, therefore, that the love of regularity is strongly implanted in the human mind; since regularity is the first principle which displays itself in the works of man composed with a view to beauty. A regular form is a solid which is composed by a repetition of similar surfaces; thus, a cube is included between six similar surfaces or planes, and a polygon is composed of many similar planes or surfaces: both these figures are uniform. The essential principle of regularity is repetition, and, in uniformity, repetition of the same form. In a cube, this regularity is of the simplest kind; in two cubes placed together, it is somewhat more composite; still more so when three are joined, and when these are of different degrees of magnitude, or when different forms are employed. In this way, *repetition* becomes the essential principle, or parent, not only of regularity and *uniformity*, but of *symmetry*, or the correspondence of parts; and thus, by causing one half of an elevation to reflect the other half, several different forms may be employed in the same design, without detracting from its regularity.

The restless activity, the love of change, or, in other words, the thirst for novelty, in the human mind is such, that we are no sooner gratified with the appearance of art, than we require regular art; and no sooner with regular art, than we require symmetrical art. From symmetrical art, the next step is to irregular art, the object of which is to produce variety.

Variety gives pleasure by exercising the mind, and by exciting its attention to one thing after another in a continuous train of sensations; the things being different, but yet allied and connected. Variety is produced, not so much by a great number of different things, as by changes in the combination of a few things. To recur to our bricks: though each brick be nothing more than a solid parallelogram, or what geometricians call a parallelopipedon, yet a thousand or ten thousand bricks may be distributed on a flat surface; either in scattered, but yet connected groups, or in a line, so as to produce an assemblage

exhibiting continuous variation of position. If we suppose them placed in a line; then, in commencing at one end of this line, and tracing all the projections and recesses in it, from one end to the other, it will be found that they are produced by a very few elements of composition: by presenting the flat side of the brick, its narrow side, or its end; by presenting these at different distances from an imaginary straight line, along the front of the varied line; by placing the bricks at greater or less distances from one another; and so on. Now, the cause of the variety thus produced is obviously contrast in the position of the bricks; for there is no difference in their form or colour, or in their light or shade, or even in their lines, further than what is produced by their position. *Contrast*, therefore, is the essential fundamental principle of variety.

The variation which we have described may be called simple variety, or variety of the lowest kind; in the same manner as a square or parallelogram house, or a round or conical hut, may be said to possess simple regularity, or regularity of the lowest kind. It is easy for the reader to conceive, that, by introducing other forms along with the square into the composition of the regular house, a composite kind of regularity may be produced; and also, that, by employing different other forms of objects besides that of the parallelogram, a composite variety will be effected along the supposed line formed by the bricks. When a great number of different forms are employed in composing variety, the result may be denominated *harmony;* and when a great number of parts, similar in form, but different in size, are employed, the result is *intricacy.* In harmony, in intricacy, and in every modification of variety in architectural productions, or in all productions the beauty of which depends chiefly upon form, the essential principle will be found to be contrast either of form, or of position — or of both.

The greatest exertions of any art, in its highest state of refinement, may be all reduced to the combination of regularity with variety: including, under the former term, uniformity and symmetry; and, under the latter, intricacy and harmony.

We have now endeavoured to illustrate the four grand principles of composition, applicable to architecture in common with all the fine arts: viz., 1. The principle of a whole, founded on the necessity of unity of sensation; 2. The principle of the recognition of art, founded on the immutability of truth, or the necessity of a thing appearing to be what it is; 3. The principle of regularity, including uniformity and symmetry, founded on the inherent love of order existing in the human mind; and, 4. The principle of variety, including intricacy and harmony, founded on the desire for novelty, occasioned by the activity of the human mind.

ART. II. *Architecture considered with reference to its Claims as a Fine Art.* By W. H. B.

THE influence of a taste for the fine arts in softening and civilising man has been universally confessed. Nor is this taste advantageous only in its effects upon society: the individual himself who possesses it derives from it some of his sweetest and purest pleasures. The fine arts, then, are worth some study; since the enjoyment arising from the contemplation of their beautiful productions must increase with the spectator's knowledge of their principles. He will receive gratification from them in proportion to his knowledge of them, and in proportion as he is competent to investigate and analyse their perfections. The uncultivated man, who sees a painting for the first time, is, no doubt, delighted; but his feeling, though it may break forth in a cry of admiration, can scarcely be compared with the pleasure experienced by a man of cultivated mind and elegant taste, who, without being so much of the artist as to have his attention engrossed by technical details, can judge of the truth of expression, the skilful arrangement of the groups, the grace and fidelity of the drawing, the judicious management of the light and shadow, and, in short, of such other essentials to excellence as may characterise the performance. Were the supposed uninitiated person to behold a piece of sculpture equal or even superior, as a work of art, to the painting, he would probably look upon it with a less delighted eye, because he would not understand it so well. The cold and colourless marble, however exquisitely chiseled, would, we think, be less easily appreciated by a stranger to the arts, than the bright and gay tints of the painting, which would remind him of the hues as well as of the forms of nature. If a work of architecture, however magnificent it might be, met the eye of our novice, it is likely that his pleasure, did any exist, would be more vague and unintelligible than in either of the former cases; for painting and sculpture find their models in the natural objects around, whereas architecture has no such resources, but presents forms and combinations peculiarly its own. As painting and sculpture imitate what all have seen, the rudest, though entirely ignorant of their principles, may receive from them that sort of pleasure which a successful imitation ever causes; especially an imitation of the works of nature, which all, in a greater or less degree, instinctively admire. But with architecture it is otherwise. Here the observer, if delighted at all, is delighted, not with any resemblance to well-known objects, but with abstract beauty of form and harmony of proportion, which, compared with imitative merit, are less manifest sources of gratification; and which, to be valued, must, in some sort, be understood.

The highest beauties of architecture consist in unity, harmony, and expression; and, as these beauties are quite independent of resemblance to nature, they cannot be perceived and felt as they should be, unless some knowledge of that wherein they consist be possessed.

The great mass of individuals actively engaged in other pursuits do not possess this knowledge; and, though many would like to add to their other attainments some acquaintance with architecture, few care to seek it in those learned and elaborate treatises where alone it is to be satisfactorily found. There may be few who cannot distinguish between the style called Gothic and that borrowed from the relics of Grecian and Roman antiquity. Probably most know the prominent features of the "five orders," which, though exclusively applicable to the style of the modern Italian school, were, for a long time after the revival of letters, duly credited by the public, as including all the varieties of the architecture of the ancients. But let us conceive a classic structure deprived of its columns; and perhaps not one of the class above referred to would be able to pronounce whether the building was in Grecian or Roman taste, or to which (if to any) of the "five orders" its proportions and enrichments belonged. Of course, such a spectator would be incompetent to tell whether the building was in the pure Grecian style of the age of Pericles, or in the inferior taste which prevailed under Roman domination; or, again, whether it was in the ancient Roman or in the modern Italian manner. Yet between these there is so great a difference, that the observer would perceive a total alteration in the character of the design, if it were to be changed from one manner to another. It is evident that such a spectator cannot tell wherein the beauties of architecture consist, as he cannot discriminate between the styles, and form a definite opinion upon their respective claims to admiration, and the reasons for their excellence or demerit. If it be said that to do this would require a sort of professional lore, important, perhaps, to architects, but uninteresting and unnecessary to others, it may be replied, that others criticise without scruple the works of architects, and thereby justify architects in demanding from them a knowledge of the principles of architectural composition. This demand is more especially reasonable in cases where the judgment of non-professional individuals is decisive with regard to the adoption or rejection of designs; as in the case of competitions for the erection of public buildings, &c. Independently of this consideration, there is much to be said in behalf of this study, as adding a new and prolific source of pleasure to those already possessed by persons of taste: for though architecture, from its artificialness, requires some study to be appreciated, and though its beauties are so abstract that it has

been called "the metaphysics of the arts," yet these beauties are displayed in the eyes of all, and whichever way we turn they meet our view. Galleries and exhibition rooms must be resorted to for paintings and sculptures; but architecture is conspicuous in every street, within doors and without. The increased dissemination of knowledge, and consequently of taste, by which these times are characterised, has had, among its many other effects, that of calling into requisition the art of ornamental design, in every dwelling the proprietor of which has the means of combining with domestic convenience that which pleases the eye. To the truth of this remark the recent alterations in the metropolis bear abundant testimony. Unless, therefore, too much has been assumed with regard to the general vagueness of information in this matter, we have works of art constantly before our eyes, from which the mass of observers can only derive a sort of undefined pleasure; and even that is modified, in many instances, by the consciousness that much of the gratification which the harmonious proportions or other merits of buildings are capable of yielding is lost to them. If they could decide upon the claims of the different styles, and determine why one edifice is more beautiful than another, they would look upon the architectural works rising up around them with intelligence and satisfaction.

The history of architecture affords many proofs that the sound judgment of a few skilful and well-informed artists can make no head against the prevailing opinions, crude and erroneous though they be, of the million who look upon their works. Fashion, as in all else, is in the present instance omnipotent. The inventive genius of Jones, the elegant taste of Wren, and the bold originality of Vanbrugh, could not prevent those eminent men from joining in the blind and unaccountable contempt with which our fine old Gothic cathedrals (notwithstanding their venerable grandeur of aspect, and marvellous skill of construction) were regarded for two hundred years previous to the latter end of the last century. The public, then, being the judge to whose decisions all must bow, will pronounce sentence well or ill, as that public is well or ill informed. Mere natural taste will not enable the uninformed to give a clear and well founded decision upon works of architecture; and, till the public become possessed of sufficient architectural knowledge to enable them to do this, perfection in architectural works never can be attained.

If, then, a nation's progress in the fine arts depends upon public taste, which again depends upon knowledge; and if such progress, till eminence be attained, is an object worthy of ambition, it is surely desirable that the public taste should be cultivated peculiarly with regard to architecture; as that, more than

any other art, bears evident and palpable witness to the refinement and civilisation of a people. The intelligent stranger, passing through a city, can judge of its architecture; though he may not have time to examine its productions in any of the other arts.

It is quite impossible to compress within the limits of a paper like the present, all that might be said on a subject involving, as this does, numerous considerations, and admitting of copious illustration: but I shall have gained my end, if I have at all succeeded in showing that architecture, being more artificial, and at the same time displaying its works more conspicuously than the other fine arts, demands and deserves more study, before it can be appreciated by the public; and that attention to the subject would not be ill bestowed, but would augment the enjoyment of individuals, and influence beneficially the taste of nations.

ART. III. *Specimen of Studies of Plan.* By W. H. LEEDS, Esq.

Too frequently do we meet, even in houses of a superior class, with instances of strange, nay almost wilful, inattention to architectural regularity, and also to convenience; a defect which, though pardonable enough in the first draft of a plan, is inexcusable when suffered to pass into execution without correction. I have observed some houses that would almost convince any one that the chief object, on the part of the architect, was to get through his task with the least possible trouble and expense of thought; the defects in them being such as a very little study would have prevented.

As even a single illustration (and I could bring forward fifty) will prove more satisfactory than mere allegation, and likewise enable the reader to determine whether I am too presumptuous in making the above remark, I shall now, for the purpose of exemplifying some of the careless oversights alluded to, and at the same time pointing out how, in that particular case, obvious faults might have been avoided, exhibit part of the plan of a villa, which forms one of the subjects in Britton's and Pugin's *Edifices of London.*

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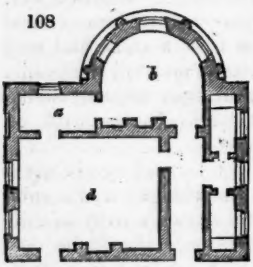

Fig. 108. shows that portion of the house which comprises the breakfast-room (*b*), and smaller drawingroom (*d*), which latter is *en suite* with a larger apartment of the same denomination measuring 51 ft. by 22½ ft., and decorated with columns. In a residence containing such an apartment as the one last mentioned, it

is but reasonable to expect that all the other sitting-rooms, however unpretending they may be in themselves, should exhibit careful study in their respective plans. Instead of which, we here perceive that, in the breakfast-room (*b*), no regard whatever has been paid to symmetry, the chimney-piece being thrown out of the centre, in order to admit a door from the corridor, on the same side of the room; which door, again, comes so close to the fireplace, that it cannot but occasion much positive inconvenience. Had the room been of the usual form, and had there been no windows on the side facing the fireplace, the irregularity just pointed out would have been neither so observable nor so objectionable; but here, the centre window and the chimney-piece being placed obliquely to each other, it becomes so marked as to be positively offensive. The architect, no doubt, adopted the readiest mode; but that this mode was the best, or that he had no alternative but either to put up with this blemish or to make such alterations as would too much disturb the rest of his plan, I must be permitted to doubt. At all events, the next figure (*fig.* 109.) points out how I would have disposed the plan, so as, at all events, to avoid the imperfection which now disfigures the room *b*. According to the alteration here introduced, not only does the breakfast-room (*b*) become perfectly symmetrical, but it acquires greater extent and variety, while the door communicating with the corridor is so placed as not to interfere at all with what is, strictly speaking, that side of the room itself. So far, perhaps, the alteration will be allowed to be an improvement; it may, nevertheless, be objected, that it is attended with no small sacrifice, namely, the loss of the little anteroom, or rather *inter*-room, *a* (*fig.* 108.), besides what is taken in on the opposite side. According to my view of the matter, however, the room *a*, which is only 6 ft. wide, is so utterly insignificant in itself, and so evidently a mere passage, that much would be positively gained in effect by reducing it, and rather considering it a kind of alcove belonging to the adjoining drawingroom, but separated from it by a glazed door; placing a sham door with a mirror in the corresponding angle, and between these two doors the fireplace, the chimney of which would connect itself with that of the breakfast-room. The reason for making this change in the situation of the chimneypiece is obvious; because it would then present itself at once to those who entered from the other drawingroom.

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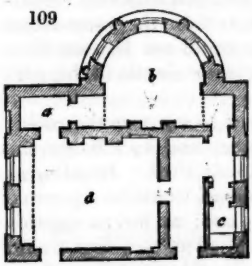

It will also be seen that, in order to have the distance between

the window and the side wall exactly the same in both angles, the plan (*fig.* 109.) encroaches a little upon this room; and also that, for the purpose both of bringing the doors nearer to an angle, and of improving the proportions of the room, the windows being in one of the narrower sides, the windows themselves are placed in a kind of break or bay. Another advantage attending this latter change is, that, instead of being, as before, out of the centre of the wall, this chimneypiece is placed equidistant from each angle. In our opinion, what is thus lost in size, in this apartment, is so inconsiderable in itself, as to be a mere trifle in comparison to what would be gained in point of general appearance. The breakfast-room, on the other hand, would be proportionally enlarged, and moreover so greatly improved, and so closely connected with this drawingroom, yet still kept sufficiently detached from it, that it might occasionally be made use of as an additional evening-room.

The other variations from the original plan hardly call for any remark, except it be that transferring the door from the corridor either to the middle (as in *fig.* 109.), or to the other angle of that wall, is, upon the whole, attended with one recommendation, namely, that it is more remote from the water-closet (*c*); while, as the window in the corridor could not be seen from the room, the depth, or rather want of greater depth, in this part of the plan would not be so obvious.

Taken altogether, the variations appear to improve the rooms *b* and *d* very materially as to appearance; and to enlarge the former, much more than the latter is diminished. Besides, as the alcove, or cabinet, if it deserve that name, would be separated from the latter room only by a glazed door; as far as regards effect, and a very considerable degree of effect too, that would more than make amends for what is actually taken away from the room itself. Instead of a window facing the door, I should greatly prefer lighting this alcove through an ornamental aperture in the ceiling; which is perfectly practicable, because there happens to be no upper rooms over this part of the plan. A large mirror might then occupy the place of the present window, by which means a very striking vista would be formed when the doors of the whole suite were thrown open. Beneath this mirror might be a slab, supporting vases and other ornaments; which, together with a few casts and busts arranged against the walls with the light falling upon them from above, would form a very pleasing little architectural scene, obtained at a trifling expense.

It may, indeed, be objected, that, after all, this would be *only* a closet. Very true; yet those who have seen the closets of this description in Sir J. Soane's house, will admit that this is not only well worth having, but far better worth some cost of

study than many things on which it is generally bestowed. The display arising from furniture and movable ornaments may be obtained at any time; not so, that which it is the province of the architect to create, and which, if omitted by him at first, is rarely thought of afterwards, and is not always, indeed, attainable, except by undoing his work, for the purpose of supplying his deficiencies.

As a still farther improvement, even upon the plan (*fig.* 109.), a very slight modification of it would suffice to convert the room *b* into a complete circle of about 16 ft. diameter, by continuing the cornice of the bay or semicircle quite round, and having draperies to enclose that part of the plan: in which case, the spaces cut off from the room might be lighted from the ceiling, like the adjoining alcove. This may probably seem to be abandoning one advantage just now held out in defence of the proposed alterations, and rather to contract than to enlarge the available space of the apartment. These draperies, however, might in general be left undrawn; since they, together with the form given to the ceiling, and carpet also, would sufficiently indicate circularity of plan, and show how it might be produced at pleasure.

What has been just stated will be sufficiently intelligible without another woodcut; at least, to those who think it worth their pains to satisfy themselves as to its practicability. Those, on the contrary, who take no interest in the subject, will rather approve of the omission, and thank me for here terminating my remarks.

ART. IV. *On Ventilation, particularly as applied to Hospitals and Sick-Wards.* By J. A. PICTON, Esq., Architect.

THE processes of warming and ventilating public buildings are so closely connected in principle, that they ought never to be attempted separately; yet we frequently see large sums of money thrown away in vain struggles to perform what a little attention to the principles of pneumatics would have shown to be impracticable. In churches, chapels, theatres, and other buildings where great numbers are assembled in a small space, the rarefaction of the air proceeds with such rapidity, that little difficulty is experienced in obtaining a circulation sufficient to keep the atmosphere tolerably pure. The greatest art required is in proportioning the apertures for the admission and exit of air to each other, and to the quantity of pure air requisite for the supply of the greatest number the building is capable of containing; and also in so arranging them, that the change of atmosphere may take place without any perceptible draft or current. There is rather an important defect observable in

most of the apparatus employed for warming public buildings by heated air; viz., that, when the apartment is sufficiently heated, and it is desirable to prevent the temperature rising, there is no mode of immediately effecting this, but by stopping the supply of air entirely, or by opening the windows, so as to admit an unpleasant draft. This might easily be accomplished by connecting a cold-air flue with the flue for heated air; having a register for closing it either wholly or partially, so that the temperature of the air admitted might be regulated with the utmost nicety.

The ventilation of hospitals and sick-wards, so as to secure a constant and regular change of atmosphere (whatever may be the difference of temperature within and without the building), is by no means an easy task. The self-regulating principle, at first sight, appears extremely desirable, as it relieves the attendants of all trouble and responsibility. The mode pointed out by your correspondent Mr. Milne (p. 64.) is extremely ingenious and elegant; but, in its adaptation to the purposes now under consideration, I am afraid, it would fail, from the operation of several causes. In the first place, as it depends for its efficacy entirely on the *excess* of temperature of the air in the room over that without, should the difference be very slight, or the excess be the other way, it would become wholly inoperative. Suppose, for instance, the temperature in the open air be 80°, and inside the apartment 65° or 70° (no very uncommon case), and the rarefaction produced by respiration equal 10°; it must be evident that the circulation will be extremely languid, if, indeed, it exist at all, and at a time of the year, too, when most needed. In a room of the description I am now speaking of, the rarefaction of the air, by respiration, proceeds comparatively slowly; and it is quite possible for the air in a room to become unfit for respiration with little or no increase of temperature. As the specific gravity of the carbonic acid gas and the nitrogen emitted from the lungs, does not differ materially from that of pure atmospheric air, it is only by its affecting the general temperature of the air in the apartment that the circulation is produced. Another disadvantage attending the plan is, that the delicate balance which is necessary to be preserved would be extremely liable to be deranged in the damp atmosphere of this country, whether the pivots on which the louvre-boards work are of metal or of wood. In high winds, too, the effect of the air externally on the broad surfaces of the louvre-boards would tend greatly to derange their operation. The principal disadvantage of the plan, however, consists in this: its obvious tendency is to preserve a certain relative proportion between the external and internal temperatures; or, in other words, to quicken the circulation when the difference is great, and to

diminish it when the difference is small, without reference to the absolute height at which the thermometer may stand: hence it necessarily follows, that, if the apertures are calculated to change the air with sufficient rapidity in the heat of summer, when the difference is very slight, they will occasion an enormous waste of heat in the winter, when the difference is very great, by carrying off the air too quickly; or, on the other hand, if calculated for ventilation as required in the winter, they will fail to answer the purpose in the summer. If it be replied, that the equilibrium of the dampers can be occasionally altered, so as to require a greater or less pressure on the lower surface to produce the same effects, it is obvious that the great advantage of the self-regulating principle will be entirely lost. I am quite prepared, however, to admit that the principle is an excellent one, and, could the practical defects I have pointed out be avoided, it would be well worthy of a trial.

Perhaps the very best method of ventilating any building where it is requisite to produce an artificial current, is by having a fire in a close chamber in the roof or upper part of the building, the only supply of air to which is procured by means of flues communicating with the different wards or rooms to be ventilated. These flues, which might be furnished with registers or slides to adjust the ventilation, would cause a constant and regular change of atmosphere under all possible circumstances, and at all seasons of the year. This plan, however, would in all cases be expensive, and in many instances impracticable. Probably the next best mode is to let the air admitted be, as nearly as possible, of the temperature which it is desirable to preserve in the apartment; with a sufficient number of apertures, furnished with slides, in such situations in the upper part of the room as may be most convenient, for the exit of the air. When the air in the apartment is warmer than that outside, of course it will have a constant tendency to rise and escape. In the heat of summer, if it is possible to procure a supply of cool air from below ground, and at the same time to heat the air above the room, so as to cause it to rise, it is evident the cooler air will be forced by the atmospheric pressure to supply its place, and a temperature below the average of that outside will be maintained. In a Lock Hospital lately erected by the trustees of the Liverpool Infirmary, designed by myself, and executed under my superintendence, an attempt has been made to combine these advantages, and hitherto with complete success. The wards for patients are rooms about 50 ft. by 20 ft., and 13 ft. 6 in. high, containing about fifteen or sixteen beds in each. There is no basement story, and the vacant space under each floor communicates with the external air by a number of small gratings. Two air-flues in the jambs of each fireplace are

open below, and communicate with the back of the grate just above the floor. The grates, of which there are two in each apartment, are registers, with air-chambers running completely round the back and sides, but separated in the middle. *Fig.* 110. shows the plan of the grate and jambs, and *fig.* 111. the front view: *a a* are the flues on each side the fireplace; *b b*, the air-chambers; and, by a lining of brick inside, the air is made to pass within 3 in. of the heated back and sides of the grate; *c c* are the slides for the admission of warm air into the apartment. These grates were executed by Messrs. Pooley and Son, of Liverpool. It will be seen, by the plan, that none of the heat at the back and sides of the fire is lost; but, being communicated to the air admitted from below, a fine stream of air, warmed, but not heated unpleasantly, is constantly pouring through the orifices into the room. For the escape of the air, there are six flues provided in each ward, about 14 in. by 9 in. each, built in the walls, and opening at the top into the space between the ceiling and the roof, with two apertures to each flue from the room, one at the top near the ceiling, and the other a little above the floor, each furnished with a slide. For the escape of the air from the space under the roof, pagoda caps, formed of concentric rings of cast iron, about 2 ft. in diameter, are fixed, one on the roof of each ward. If it is required to preserve as much heat as possible in the apartment, by closing the whole of the upper slides, the air being able to escape from the bottom apertures only; the whole mass of air in the room must be heated to one temperature before any can be permitted to escape. In like manner, by opening or closing any portion of the slides for the admission or exit of the air, the temperature and ventilation may be regulated at pleasure. In the summer, the air in the space under the slates, being highly rarefied by the direct action of the sun's rays on the upper surface, is continually passing off through the caps; while the air admitted through the apertures *c c*, coming from the subterranean space below the floor, is considerably below the temperature outside. In addition to this, the windows can, of course, be opened when requisite; and, being all on one side of the rooms, and a considerable height from the floor, any unpleasant draft is avoided. Of the efficiency of the above plan, I can speak with the utmost confidence;

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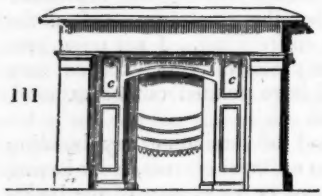
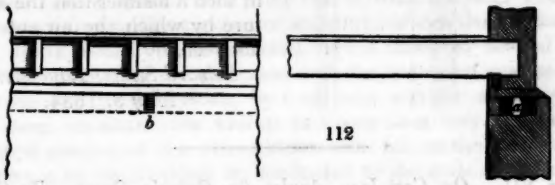


and its simplicity and cheapness will, I think, be evident on inspection. The warmth diffused by the grates is such, that, though two are fixed in each ward, of the size mentioned above, it has never been found necessary to use more than one at a time.

Liverpool, April 18. 1834.

ART. V. *On a Method of preventing the Damp from rising in the Walls of Buildings on Clay and other moist Soils.* By WILLIAM J. SHORT, Esq., Surveyor.

ON reading Mr. Hawkins's article (p. 123.) on the means of preventing injury to walls, &c., from damp, it has occurred to me that the following method might be employed to prevent the damp from rising in walls, at the same time that it provided ventilation sufficient to keep dry and preserve the timbers of the ground floors. When building the house, I would leave, as the works proceed, a vacancy or channel in the centre of all the walls, as shown at *a* in *fig.* 112., laying over the same, slabs of hard



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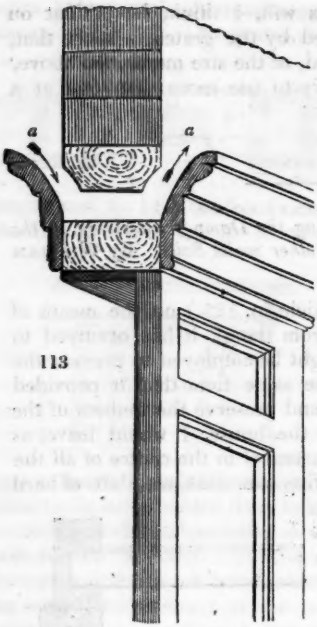
cheap stone or slate, which may be chamfered off so as to form a neat finish to the plinth round the outside of the building. At various intervals, I should propose that small openings communicating between this channel and the interior of the building (as shown at *b*) should be made; so that a current of air from the exterior may be driven through the channel and openings under the floors, in order to sufficiently ventilate the same.

The only increased expense will be the difference between a course of stone or slate and a course of bricks; as leaving the vacancy or channel will be, if any thing, a saving.

Clapham, May, 1834.

ART. VI. *On a Method of curing Smoky Chimneys, and of ventilating Rooms.* By Mr. SAUL.

I HEREWITH send you a sketch of a plan for curing smoky chimneys. It is the invention of Mr. R. Hall of this town, a



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professed chimney doctor. I have seen several rooms where it has been adopted, which have been completely cured of smoking. As the plan is very simple, it may be executed at a trifling expense.

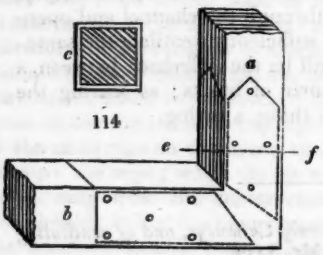
A current of air passes over the door behind the architrave or moulding (*a a*, in *fig.* 113.); the arrows show the way by which the air enters; and, as it rises direct to the ceiling, a person sitting in the room feels no draught whatever.

This plan may be adopted without disfiguring the room in the least, as the architrave is taken off and rounded on the back part, and is then replaced in such a manner that the aperture by which the air enters is not seen.

Sulyard Street, Lancaster,
May 3. 1834.

ART. VII. *On Cast-Iron Angles for Outside Doors.* By C. H. CAPPER, Esq., Civil Engineer.

I HAVE often thought that outside doors might be greatly improved by having cast-iron angles at the bottom, in the following manner: — In *fig.* 114., *a* is the upright style; *b*, the bottom rail;



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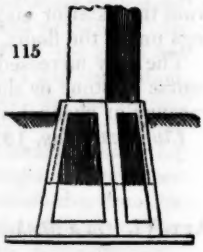

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c the horizontal section at *e f*, showing the top of the iron angle foot, and the section of the style. The expense of these angular pieces of cast iron would be about 7*s.* or 8*s.* a pair. There would

be much saving of labour in making door frames in this manner; and, as the angles of doors constructed wholly of wood are liable to rot, those with cast-iron angles would have a great advantage over them.

The same plan may be applied to posts for parks, &c., by having iron sockets (*fig.* 115.) made very light, and to fit on to the part to be inserted in the ground. These sockets may, I think, be made at from 3*s.* 6*d.* to 4*s.* each; and, of course, there will be a saving of timber when they are used.

Birmingham, June 16. 1834.

Art. VIII. *Dovetailed Caps for Wooden Fences.* By W. Y. Hindle, Esq.

A description of a wooden fence which may be put together without the use of nails, screws, or other iron-work, is given in p. 79., in which the inventor states that wooden pins "are liable to various objections, and do not make so neat a finish as where nails are used." Now, I shall feel obliged if you or any of your correspondents will point out in what respects wooden pins are either unfit or inelegant for works of this description.

I think Mr. Cottam's dovetail cap is liable to several objections; namely, the expense, and the increased number of grooves and tenons, which, by receiving, and for a long time retaining, moisture, are known to decay in a very few years. A great portion of the rain which would fall on the cap would, by means of the dovetail, be conducted to the ends of the rails, which, together with the dovetail, would shortly be rotten. I am of opinion that the end of the dovetail is more unsightly than a wooden pin, though certainly neater than the wedges under the bottom rail, shown in Mr. Cottam's sketch. This method of fastening would not prevent the top of the post from being moved sidewise, as there is nothing to tie the rail firmly to the post. The cap, by swelling and shrinking, as the weather was moist or dry, would soon become loose; and, when cattle (as is frequently the case) rubbed themselves against it, it would fall off, and the rails probably be lifted from their bed and broken.

I should suggest the fastening of the upper rail in the manner shown in the accompanying section (*fig.* 116.), where *a* is the cap, having one end of a strong wooden pin (*c*) driven tight into it.

The corners of the cap, formed so as to drip the water at four points clear of the rails, are shown at *e e*; and the rails (*d d*) are overlaid and fastened in the post (*b*) by the pin (*c*). The bot-

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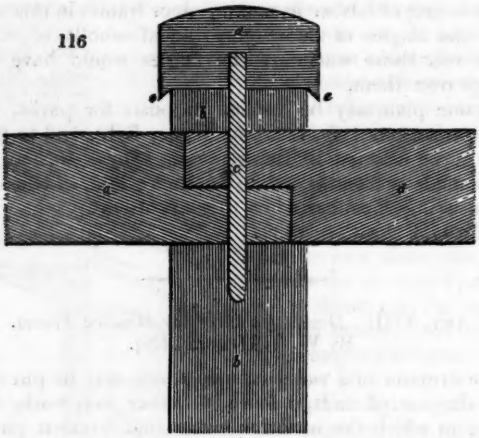

tom rail need not have any fastening farther than being overlaid, as the bottom end of the post (being fast in the ground) could not be moved aside.

Barnsley, April 13. 1834.

ART. IX. *Architectural Maxims.*

IF *Blank Windows* are ever allowable in original compositions, it can only be where they form part of a system of windows. To introduce them where they form no part of such a system; that is, where there are no real windows at all in the elevation, as in the exterior elevation of the Bank of England, and in the front of the National Gallery at Charing Cross; is contrary to every sound principle of architectural composition.

Pediments.—There are few things more objectionable in Grecian or Roman architecture than that of placing a pediment where it could not, by any possibility, be on a large scale the end of a roof, or on a small scale the protection to a door or a window.

Imitation and Invention.—Architecture, as an art of mere imitation, may be judged of by rules and precedents; but, as an art of invention, it must be judged of by general principles. In imitating an old castle, priory, or abbey in a modern villa, all the peculiarities, and even faults, of the originals may be copied, in order to keep up the illusion; but, in composing an original design in the castle or abbey styles, the general forms, details, and manner of composition, require only to be attended to.

REVIEWS.

ART. I. *The Civil Engineer and Machinist: Practical Treatises of Civil Engineering, Engineer Building, Machinery, Mill-Work, Engine-Work, Iron-Founding, &c. Designed for the Use of Engineers, Iron-Masters, Manufacturers, and Operative Mechanics.* By Charles John Blunt and R. Macdonald Stephenson, Civil Engineers, Architects, &c. Division I., containing Boulton and Watt's Portable Twenty-Horse Steam-Engine complete.

ACCIDENT prevented our obtaining a sight of the first division of this magnificent work, in time to give it such a perusal as would enable us, in the present Number, to place it in a clear light before our readers, and to aid them in forming a correct notion of its peculiar merits. A cursory glance at its contents, however, is abundantly sufficient to warrant our high commendation; and to elicit a strong desire that the public may, by liberal support, encourage the authors to proceed with profit, as well as pleasure; for sure we are, that nothing short of the pleasure of producing excellence could have induced them to incur so much labour and risk as are evident on the face of this publication. From our hasty inspection, it appears that Boulton and Watt's 20-horse steam-engine is accurately delineated; that the details are correctly given, and with a minuteness that must delight every person seeking sound information on the subject. We confess that we have repeatedly seen the prospectus of this work stitched up in the numbers of some of our scientific journals, and we felt it as obtruded upon our notice by some determined book-maker; but we passed it over as another of those traps with which we have before been caught, and induced to part with our money, and waste our time, in the endeavour to pick out a few grains of corn from among a large quantity of chaff. Our satisfaction is indeed great at finding ourselves so agreeably disappointed, in observing that the performance exceeds every thing that could be expected from the promise. We purpose, in our next Number, to enter more minutely into the particular merits of this highly useful work, a division of which, it is announced, will be published every six weeks, price one guinea; a sum very moderate indeed, for twelve folio engravings, besides letter-press descriptions. Nothing short of an immense sale can remunerate the proprietors. — *C. C.*

ART. II. *Journal für die Baukunst.* In zwanglosen Heften. *Journal of Architecture.* In Parts, published occasionally. By Dr. A. L. Crelle, Royal Prussian Architect, and Member of various Societies. Vol. VII. Part I., with 6 Plates. 4to. Berlin, 1833.

DR. CRELLE is considered one of the most scientific architects in Germany, and he is at the same time a man of letters.

He can hardly be said to be in much practice as an architect, though he enjoys the situation of president of the architectural council, or, as we should say, board of architecture, of his Prussian majesty. We intend to give an account of all the principal articles in the six preceding volumes of Dr. Crelle's work; not only for the gratification and instruction of our readers, but to show them that the literature of the architecture of Germany is much more copious than that of England.

Art. 1. in Part I. of the seventh volume, now before us, is entitled, "Some remarks on fire-proof stairs," by M. Engel, a Russian architect. The author proposes to include the stairs in a square tower, with a small well-hole, or square in the centre. This would give, to form the central well, four piers, which are to be connected by arches in the direction of the stairs. These arches are to support, in common with the side walls, the steps composing the stairs. Such staircases are to be met with in the Old Town of Edinburgh, and in Paris; and in various stone-built towns on the Continent. In this country, the surrounding piers, walls, and arches might all be built of brick; and the steps over the brick arches formed of artificial stone. Art. 2. is the description of a floating sluice in North Holland, translated from a French work. Art. 3. is the description of a Dutch causeway, made with clinker bricks; a kind of road very common in Holland. This paper, and the preceding one, are rendered very plain by excellent engravings. The fourth article is on paper roofs; of which it appears that there are a number, both in Russia and Sweden; and, according to a note by the editor, also in Germany. Art. 5. is entitled "The Church of Kraschen, with some remarks on the style of the middle ages in church building," by M. Rimann, architectural surveyor at Wohlau, in Silesia. This article is illustrated by some engravings; which we intend to have copied; and we shall give them, along with the translation of the article (to us the most interesting one in the part), in a future Number.

ART. III. *Catalogue of Works on Architecture, Building, and Furnishing, and on the Arts more immediately connected therewith, recently published.*

BRITAIN.

GOTHIC Ornaments, illustrative of Prior Birde's Oratory, in the Abbey Church, Bath. By Edward Davis, Architect, Bath. No. 2., Imp. folio. London, 1834. 5*s.* 6*d.*

The engravings in this second number are still better executed than those in the first. They are as follows: — 1. A panel, or compartment, filled with a flower. 2. A finial, or upper canopy, forming a corbel. 3. Part of a cornice, with the frieze beautifully covered with foliage. 4. Part of a transom, with one of the heads, from the lower compartment of a window. 5. Bosses (small projecting ornaments, like rosettes), from the exterior.

A Series of Original Designs for Shop Fronts, forming a Collection suitable to Persons connected with the Practical Part of Building. By Henry John Whitling, Architect. 4to. London, 1834. 12*s.* 6*d.*

In the preface, the author states that his object, in submitting this work to the public, is, "to demonstrate the practicability of producing, in shop fronts, an effect of a pleasing and appropriate character, without resorting to that ultra system of decoration, which at present so extensively prevails in the metropolis." As a work of art, his book, he says, has no pretensions whatever; his objects being cheapness and utility. There are twenty-two plates of elevations, most of which are plain and neat, and three of sections of the pilasters, cornices, and entablatures. There is one trifling objection, which we have to most of the designs, which is, that at the ends the cornices are generally returned. Now, as any one may observe, when walking along the streets of London, and as our correspondent R. has pointed out (p. 113.), these returns can seldom be carried into execution, without disfiguring the elevation. A much better plan, we think, would be, to finish the entablature against a block, in the manner shown in fig. 53. p. 116.; or in any analogous manner, so that each design might be completely independent of that adjoining it, with respect to execution. With this correction, the work will be useful to builders and carpenters. We do not like the half and three-quarter columns stuck on as mere ornaments, and we think young architects ought to have courage enough to reject all such prostitutions of one of the noblest features of architecture, and genius adequate to finding an unobjectionable substitute.

FRANCE.

Le Père la Chaise, ou receuil de plus de 150 desseins au trait des principaux monumens de ce célèbre cimetière, avec leurs échelles de proportion. Par Quaglia, ancien peintre attaché à l'Impératrice Joséphine. Paris, 1834. 12 francs.

Tarif des Prix des Ouvrages de Bâtiment. Par un vérificateur expert. Paris, 1834. 1 tom. 12mo. 3 francs.

Constructions de Charpentes. Par Krafft. Renfermant des planches relatives aux travaux maritimes et navigation; écluses de toutes grandeurs, vannes, caissons pour la construction des vaisseaux, docks, claire-voies, jetées, digues et murs de quai, machines pour couper les herbes et nettoyer les canales, &c. 28 plates, with explanations, forming one vol. folio. Paris, 1834. 36 francs.

This is evidently a very important work; the machine for cutting the weeds of and cleaning canals, is probably that of Bétancourt.

Traité de l'Art de la Charpente. Par Krafft. Carpentry and Joinery, as applied to the interiors of houses. 31 plates, and detailed descriptions. Folio. Paris, 1834. 24 francs.

Construction des Bâtimens et d'Habitations en Charpente. Par Krafft. 82 plates, with explanations. Folio. Paris, 1834. 54 francs.

Art de la Charpente. Par Krafft. Contenant plus de 500 modèles de ponts tournans, ponts de bateaux, ponts levis à coulises et à bascule, machines à épuisement, batardeaux, pilotis, caissons, grues, &c. One vol. imp. folio; 63 plates, with explanations. Paris, 1834. 48 francs.

Krafft, as will be seen by our Paris letter, died lately. His works, the most valuable of which are enumerated above, are in general estimation throughout the Continent.

ART. IV. *Literary Notices.*

MR. COTTINGHAM is about to publish some prints of his restoration of Armagh Cathedral.

Ferrey's Christ Church, Hampshire, will be out about August 10.

Mr. W. Billinton, architect and civil engineer, Wakefield, is publishing by

subscription, a south-west view, 21 in. by 16 in., of the parish church of All Saints, of that town.

The following Works have just appeared: — Clark's Plans, Elevations, Sections, and Details of Eastbury House, Essex, in large 4to; 2*l.* 2*s.* Blunt and Stephenson's Civil Engineer: Division I., The Steam Engine, 12 plates, 1*l.* 1*s.* Lockwood and Cater's Ancient Gates and Fortifications of the City of York; royal 4to, plates; 18*s.* Dodd's Mechanics for Practical Men; 8vo; 7*s.* 6*d.* Pugin's Fourth Part of the Second Series of Gothic Examples; 1*l.* 1*s.* — *J. Weale. Architectural Library, 59. High Holborn, July* 12. 1834.

Ram Raz on Hindu Architecture; 4to, with numerous plates; 1*l.* 11*s.* 6*d.* This work, which is very curious and interesting, we shall review at length, in our next Number.

MISCELLANEOUS INTELLIGENCE.

Art. I. *General Notices.*

Dyeing Maple or Satin Wood with Cochineal.—I observe, in a London newspaper, a notice of the invention of a mode of embellishing maple or satin wood by dyeing it with cochineal. This is an old Swedish practice. In that country they use knotty pieces and roots of the birch, which they appear to plane with a plane which is not very sharp, so as to throw up the fibre more in some places than in others: they then dip these thin boards into dyes of various kinds; and, as the raised fibre imbibes colour faster than the smooth cut parts, a delicate variety of tint is easily produced. The boards, when dry, are smoothed and varnished, and make very beautiful furniture. — *J. R. Edinburgh, Feb.* 8. 1833.

A Cock for Boilers, in Kitchen-Ranges of a superior description, is mentioned p. 46., and the following is a description of it, taken from the *Repertory of Arts*, vol. i. n. ser., p. 154. *Fig.* 117. represents a section of the cock, and the other parts connected therewith: *a* is the plug; *b*, the hot-water passage; *c*, a pipe connected with the hot-water passage; *d*, cold-water supply pipe, leading from a tank or reservoir, whence the supply of water to the boiler is obtained: the pipe *d* leads to the cold-water passage *e*, and thence to the water passage *f*, when the plug is turned for the purpose of withdrawing hot water. *Fig.* 120. is an end view of the cock, which shows the hot-water passage, and also two cold-water supply passages. *Fig.* 118. shows the plug separately, with the hot-water passage *a*, and cold-water passages *e* and *f*. *Fig.* 119. is a section of the cock, for the purpose of showing the cold-water passages *e* and *f*. These three

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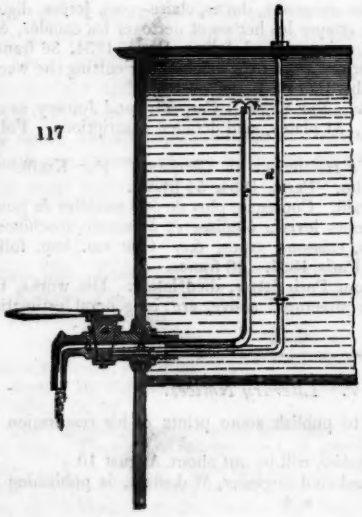
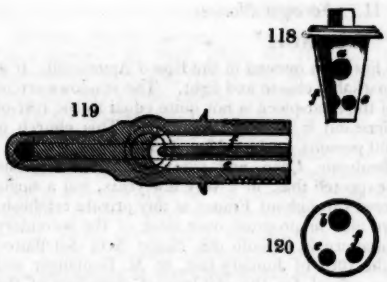




last figures are drawn to double the scale of *fig.* 117. The advantage of such cocks is, that the turning of the handle, to draw hot water, acts upon the cold-water passages by means of a double plug and barrel in the cock, so that an equal quantity of cold water is admitted in the boiler to that which is withdrawn from it; and, as these two water passages are adjusted to each other, the boiler will always contain an equal quantity of water, and thereby do away with the danger of its bursting from the circumstance of the water becoming low; therefore, by the application of cocks of this description, the boiler will at all times be properly supplied, and the height of the water in it cannot vary in the slightest degree.

It will be seen that, when the cock is opened for the passage of the water, which will flow down the pipe *c*, into the water passage *b*, at the same time the water will descend from the supply tank, by the pipe *d*, into the cold-water passage *e*, and thence through the plug into the water passage *f*, which communicates with the boiler. The hottest part of the water will at all times be withdrawn, in consequence of the pipe *c* ascending to just below the surface of the water in the boiler; and the water, of course, can never be drawn through the cock unless the water line be above the pipe *c*.

The pipe through which the hot water is withdrawn, and the supply pipes, are regulated to such a nicety, that even the downward pressure of the column of water, and the expansion of water in a heated state, are considered in their construction. It is also evident that this arrangement of the supply may be varied, and applied to all sorts of boilers, where a change in the supply of water is desired.

Slabs of Slate fixed in a Bed of Concrete, as a Substitute for Granite Sleepers for Iron Rails. — This plan is in contemplation for the London and Birmingham railroad; and, with a view to prove the strength of slate so bedded, some experiments were made, July 2., on the premises of Messrs. Cottam and Hallen, in the presence of Mr. Solly the chairman of the company, Mr. Stephenson the company's surveyor, Mr. Palmer the engineer, and other gentlemen; from which it resulted, that slate, of a certain thickness, will answer all the purposes of granite, as a sleeper for the rail, at less than half the expense of that material. It was found, by the hydraulic press, that a cubic inch of slate will sustain a pressure of three tons and a half; and that, consequently, slate of an inch and a half thick is more than equal to any pressure which it can be required to support on the railroad. Slabs of slate, of sufficient size and thickness, may be had for the purpose in abundance, from the quarries in Wales, Cornwall, and Ireland. It will require some ingenuity to fix them in the concrete, so as to prevent them from being shifted from their places by the vibrating motion of the wheels of the engines and waggons. In order to ascertain the best mode of effecting this object, it has been arranged that 300 or 400 yards of the Birmingham and London railroad should be laid with slate sleepers in the first instance. (*Morn. Chron.*, July 7. 1834.)

Slate has lately been used as flooring for shops in London, and it has also been laid down in the Strand as foot pavement; in order to prove, by experiment, its durability relatively to that of Yorkshire flagstone. Its strength is such, that it might be used in all warehouses instead of boards for the floors; and thus, by means of cast-iron joists, such buildings might be most effectually rendered fireproof. In common dwelling-houses, fireproof partitions, and fireproof chests and closets, might be formed of the same material joined by iron or copper.

Art. II. *Foreign Notices.*

FRANCE.

The new Protestant Church has been opened in the Rue d'Aguesseau. It is in the Gothic style, and is remarkably chaste and light. The windows are of stained glass. The drapery of the altar-piece is not quite equal to the rest of the decorations; but we understand it is only temporary. This church is capable of containing about 800 persons. — *L. May*, 1834.

Abattoirs are erecting at Boulogne, Caen, and many other towns in the French provinces; and it is expected that, in a very few years, not a single head of cattle will be slaughtered throughout France at any private establishment. Suspension bridges are also in progress over most of the secondary rivers. The section of architecture in l'Ecole des Beaux Arts distributed prizes, at their meeting on the 10th of January last, to M. Boulanger and M. Gounod, for designs for a school for the children of chevaliers of the Legion of Honour; and to M. Guenepin and to M. Boulanger, for designs for aviaries in pleasure-grounds. Trottoirs (or, in other words, paths for foot-passengers) are about to be added to all the streets of Paris; so that persons may, in future, walk through that bustling capital without fear of either mud or cabs. M. de Mauneville has invented a machine for making parquetted floors, or rather for preparing the boards of which such floors are made; which promises to bring parquetted floors again into fashion. M. de Mauneville's establishment is at Troussebourg, near Honfleur. In the architectural department of the salon for 1834, M. Clerget has a picture, representing the supposed original appearance of the temple of Augustus and Livia; the ruins of which are still in existence, at Vienne in Dauphiné. These ruins are sufficiently preserved to make it easy to form a general idea of what the temple once was; but M. Clerget differs from M. Rey (who gave a view of it formerly) as to the details. Under the name of religious historical architectural studies in the middle ages, M. Albert Lenoir has exhibited the ancient façade of St. Laurent, at Rome, as exemplifying the style of the fourth to the ninth century; St. Maria Toscanella, for the Byzantine school of the eleventh century; and the cathedral of Parma as an example of the style of the twelfth century. Besides these views of ancient edifices, there are some designs for modern buildings. Among the latter are, a plan for uniting the palaces of the Louvre and the Tuileries, and one for restoring the Théâtre Français. Two designs were exhibited for a pedestal for the statue of General Hoche, to be erected at Versailles; but neither of them have been accepted. In fact, after all, it is found so difficult to make a pedestal for this statue (which, by the way, was originally designed for the Temple de la Gloire, now La Madelaine), that M. Marochetti, sculptor of the department, has agreed to form a new statue and pedestal complete, for the same sum as it would cost to adjust a pedestal only to the present statue! M. Douchain, architect, of Versailles, is to do the building part, and the government is to supply marble. It is estimated that the expense will be about 22,000 francs. Among the articles in the "Exposition des Produits de l'Industrie" are the decorations of a room all in steel: doors, chimney-piece, clock, candelabra, and, in short, all the usual ornaments of a drawingroom, are in steel. The effect is singular, but somewhat gloomy.

With regard to architectural news, the celebrated Château de Pompadour, to which so many historical recollections were attached, has been nearly destroyed by fire; and plans are already on foot for rebuilding it. An architectural society has been established in Paris, under the title of Société Libérale des Constructeurs d'Edifices publics et particuliers; and persons wishing to become members are directed to apply (postpaid) to M. Douchin, Rue Aumaire, Nos. 3. and 5. The Church de la Madelaine is at last completed; but I shall speak more in detail of this edifice in my next. Krafft, whose works on carpentry are considered the best in France, died lately, at the age of 65.

GERMANY.

Women Mortar Carriers. — At Vienna, women are always employed to carry mortar. In 1827, when Mr. Hawkins, the engineer, was building a sugar-house there, nine stories high, he employed a hundred bricklayers at one time, and fifty female mortar carriers. These women carried the mortar up four-story ladders outside the building; and thence up seven other ladders inside, from story to story. Each woman serves two bricklayers; and, when these bricklayers leave work, the woman who attends on them cleans their trowels and other tools, and wraps them up in the men's aprons, and puts them in a secure place till the morning, when she must have them ready for the men at their time of beginning to work. It is singular that a custom which, we are apt to think, belongs only to a very rude age should prevail in such a highly civilised and humane society as that of Vienna, where all classes, from the lowest to the highest, are educated; and where all, without exception, are polite. But in this very country, where women are thus daily employed in the labours of men, it would be thought shocking if a female were to be seen on the outside of a coach. Such are the anomalies of society.

DENMARK.

In the Annual Exhibition of the Danish Academy of Arts, which opened on April 1., out of 305 subjects, there were 44 of architecture and machinery. (*For. Quart. Rev.*, May, 1834, p. 466.)

Copenhagen, June 10. 1834. — The king has given orders to repair the palace of Rosenburg, and it is said that he intends renewing the furniture, partly from the cabinet-makers and upholsterers in Paris and London. You are no doubt aware that the rooms in this country, as in Sweden, are generally finished in water colours; and that paper, and also wainscoting, are very uncommon. The king intends to have the principal rooms papered with some of the newest French papers; and the grand hall of entrance, which is at present painted in imitation of freestone, will assume the character of marble. All the windows on the principal floor will be renewed, and narrow astragals and plate glass used, as in the best houses of London and Paris. Your horticultural correspondent, Petersen, is making various improvements in horticultural buildings, respecting which he will no doubt write to you very soon. — *F. Jorgensen.*

GREECE.

Since peace has been established, the rich Greek merchants have purchased immense estates from the Turks, in the Island of Negropont; and a plan is now in agitation for rebuilding Athens on the opposite coast. The engineer Cleanthes has been employed to form a plan for this purpose; but his plan has not given general satisfaction, as it is thought he has consulted private interest rather than public convenience in the arrangement of the streets. The city is intended to contain 80,000 inhabitants; and the engineer proposes to combine in it imitations of the Palais Royal and the Tuileries of Paris, the Place of St. Mark at Venice, and all the other most celebrated architectural ornaments of the different cities of Europe. The city is to be about three miles from the port, with which it is to be connected by a kind of faubourg. All the streets and public places are to bear the celebrated names of antiquity. (*La Propriété*, June, 1834, p. 375.) There seems something very absurd in setting about building a town for a given number of inhabitants; and still more so in the idea of transferring to Greece imitations of modern squares and buildings, and giving them classical names. There is, however, little danger of the scheme being carried into execution.

An engineer has been sent to Syra, to superintend the construction of various edifices, rendered necessary by the increase o. commerce. Among them are a lighthouse, an entrepôt for merchandise, and a new lazaretto. The latter is much wanted. (*Athenæum*, vol. for 1834, p. 324.)

Art. III. *Domestic Notices.*

ENGLAND.

Fires in London.— One cause of the frequency of fires in London is the imprudence of persons wishing to put up stoves, &c., in cutting into party walls, without having any regard to what may be on the other side. In this manner, the flues of stoves, &c., are often brought dangerously near woodwork; and if, from any incidental cause, a fire is made of rather more than ordinary potency, the wood in the next house, on the other side of the wall, becomes ignited, and a fire ensues, for which, at first, there appears no assignable cause. There is a law which obliges all persons intending to make alterations in the party walls of houses in London, or to make exterior additions to, or alterations in, them, of any kind, to give notice to the district surveyor; but though it is generally attended to with respect to exterior alterations (for these, being seen by every body, are soon noticed by the surveyor), it is as generally neglected in the case of interior ones. In a case which came before the Lord Mayor, June 19. 1833, the party wall of a house in Snowhill had been cut into to such a degree, for the purpose of setting a kitchen stove, that a hole was actually made into the next house; and the party wall became so hot, when the kitchen fire was lighted, as not to be endured by the hand. The person who inhabited the house into which the hole was cut, stated that the paint had become all blistered with the excessive heat. The Lord Mayor said, that often, in setting up a kitchen range, workmen cut into the backs of the cupboards of the kitchen in the next house, and in a short time afterwards a fire broke out, for which no one could account.

Mr. Nixon's Show Rooms and Warehouses, in John Street, Oxford Street, contain at present a number of specimens of inlaid French furniture, and of tables, looking-glass frames, and other articles, in the style of Louis XIV., all imported from France. Among these are included a number of the mouldings, architraves, and other members used in the fitting-up of rooms, belonging to that period, and a number of marble chimney-pieces. The work on these marble chimney-pieces is nothing like so good as the best English workmanship, but the charm of their being really French is all-powerful. Such is the effect of this charm, that many articles of Louis XIV.'s time are purchased, admired, and imitated, for no other reason than their antiquity.— A mode of printing coloured flowers on velvet, newly invented, and practised by the French, is so perfect and beautiful, that we do not see how it can be discovered (unless by its durability) from painting by hand. Mr. Nixon has imported several covers for chair bottoms of this material; and nothing can exceed the brilliancy of their colours, and the accuracy and delicacy of their execution. The flowers, inlaid in tables, cabinets, and in different ornamental pieces of furniture, are of a richness and beauty that is hardly to be conceived by one who has never seen them; and they are so well represented, that they may be known in a moment by any florist. We had great pleasure in looking over Mr. Nixon's collection, on May 23.

Separating Sea Water from its Salt.— This was effected by Mr. Fraser of Long Acre, upwards of twelve years ago. His plan was, to employ a particular description of cooking-range adapted for ships, which boiled and distilled at the same time. An improved plan of effecting the same object has lately been brought into notice by Messrs. Wells and Westrup, who have taken out a patent for a machine for converting sea water into excellent fresh water. The process was exhibited in a vessel in the river near Westminster Bridge, 14th June, 1834, before a number of scientific gentlemen. The conversion is effected by distillation, the condensation being produced by passing the pipe, by which the steam is carried off, through the side of the vessel, into the river or the sea, and returning it into the vessel again at a sufficient distance for condensing the steam; which then flows out in a stream of pure fresh water. The top of the cistern in which the sea water is boiled is formed to allow cooking-kettles to be placed in it, and, of course, any thing contained in them

may be boiled by the heat of the steam, so that the cooking for a ship's company may be performed by the same process that shall supply them with a sufficiency of fresh water. The process converts nine tenths of the sea water contained in the cistern into pure fresh water, in about twelve hours. The cistern by which the process was performed on Saturday, contained about 133 gallons, and in twelve hours about 120 gallons of fresh water was produced. The gentlemen present all tasted the converted fresh water, and pronounced it excellent. (*Morning Advertiser*, June 16. 1834.)

Subscription for Mr. Peter Nicholson. — Sir Jeffery Wyatville, with his usual munificence, has written to Mr. Weale to request that he will put his name down to the subscription for Mr. Peter Nicholson for 10*l.* — *J. W.*

The Collection of Books of the late Mr. Taylor, of the Architectural Library, High Holborn is to be sold by auction on July 21., which will afford a fine opportunity for architects to enrich their libraries. Mr. Taylor's premises have been taken by Mr. Weale, who has already removed to them his stock of architectural books from Broad Street.

The Obelisk of Luxor, mentioned p. 46. — In the *Mechanics' Magazine*, Nos. 570. and 571., for July 12. and 19. 1834, there is "An Account of the transportation of the obelisk of Luxor to Paris," illustrated by six engravings. It is extremely interesting; and we would recommend every young architect, who does not take in the *Mechanics' Magazine* (though we should think there are few who do not), to purchase these Numbers, and to bind them up as a supplement with the first volume of the Architectural Magazine.

Norfolk. — Perkins's system of heating by hot water is making great progress here, under the superintendence of Messrs. Parlour and Sons. Mr. Coke of Holkham, is building a wall 9 ft. high round his park, which is 14 miles in circumference. It will cost 3000*l.* per mile, and it is to go on at the rate of two miles per annum. It is to be game proof. Building is in a very dull state here; so much so, that many of the best joiners are unemployed. In p. 205., Stanfield Hall is mentioned. There is a modern staircase in a Gothic Hall in this mansion, and a frightful one it is. I am aware of the want of precedent for Gothic staircases; but Mr. Salvin has surmounted that obstacle nobly, in our Norwich cathedral, in the ascent to the pulpit. I have just received Blunt and Stephenson's new work; and it is certainly a very splendid one. I have been fully employed of late, principally in my manufactory. I shall shortly get up a very elaborate machine for drying paper as it comes from the making-machine (Fourdrinier's). I am glad to see Mallet's name again in your Magazines. I have read Junius Redivivus's article on your *Encyc. of Architecture*, in *Fox's Repository*. The great engineer, ——, has made a grand blunder at Denver Sluice in this county. It will probably be the last job he will have in the Fens. — *W. T. Norwich. July* 6. 1834.

Sussex. — *The Worthing Clock Tower.* — In pursuance of a public invitation to architects, of the 26th November, 1832, for designs for the erection of a building for the reception of a clock with four dials, to be placed in the most conspicuous spot in South Street, Worthing, several designs were submitted, and one in the Gothic style, by Mr. S. H. Benham, architect and surveyor, of Brighton, was adopted. Some doubt having been raised as to the stability of Mr. Benham's design, if carried into effect, he explained the principles of its construction, in a letter addressed to the *Brighton Guardian*, from which the following is an extract: — "The figure of my plan is octangular (a figure which I preferred, as being best suited to the site), and 18 ft. in diameter. The outer wall is 12 in. thick, with pointed arch openings in each side, and supported at the angles by buttresses 1 ft. 3 in. thick, 2 ft. 6 in. in projection, and 30 ft. in height, diminished and weathered (beveled so as to prevent the rain from lodging) upwards, to receive the clock room, and the open belfry surmounting it, the walls of which are also 12 in. thick, and are connected with the outer walls by an arched corridor 3 ft. wide; thereby giving additional and considerable strength to the height, for the purpose of securing greater stability to the diminished superstructure, springing upwards from the base line

altogether from 50 to 60 ft.; the centre of the dial from the ground line being 40 ft. The angles of the diminished clock room are also supported by buttresses of ample dimensions, springing directly from a deep weathered coping of the sub-structure of 30 ft., before named, finished by crocketed finials, from 4 to 5 ft. in height, above the clock room, and terminated by pinnacles. The belfry (which is 5 ft. in the clear, and 7 ft. externally) stands down upon the top of the weathered cornice, encompassing the upper part of the clock room; and, within the pinnacles, crowned by a cyma-recta roof crocketed at the angles, and terminated by a finial of suitable proportions. The depth of the foundations of the structure would, of course, be determined by the nature of the soil; their thickness would be 18 in., with inverted arches under every opening; and, under the arched corridor, formed by the outer and inner walls; giving a good and substantial base-work to erect the superstructure upon. It is well known to mathematicians that, the nearer the figure of a plan approaches to a circle, the stronger it is in its constructive principles. Hence engineers, in the construction of batteries or walls of defence, invariably adopt for their plans many-sided figures, viz., pentagons, hexagons, heptagons, and octagons, and very frequently plans resembling (in outline) stars, in consequence of their great strength at the angles over every other kind of figure, and carry such works into effect with less materials; these figures possessing greater strength than any other kind of plan which has its walls at right angles. The strength of a building is not dependent upon a mass of materials being thrown (pell-mell) together, without regard to sound principles. The acme of science is to accomplish great ends with small means, and this can only be done upon sound principles. Now, with regard to the material, I propose using, for the sake of economy, "Ranger's patent stone," a material that can be used for one third less than brickwork, and Parker's cement; this stone is most assuredly the best and strongest for the purpose, in consequence of its being cast in blocks, varying in height, length, and thickness, as circumstances may require for the work." — *S. H. Benham. Brighton, May* 5. 1834.

Art. IV. *Retrospective Criticism.*

The Architectural Magazine, No. I. — I agree with Scrutator to the very letter, and have no fear of common sense prevailing ultimately. Mr. Trotman's remarks on Egyptian Architecture (p. 20.) reminded me of an idea I have long entertained, viz., that Egyptian architecture is peculiarly applicable to engineering work, particularly for the piers, &c., of suspension bridges. [It has been applied to smelting furnaces by Dr. Macculloch.] Mr. Kent condemns zinc roofing. I think you ought to enquire whether he includes Mosselman's zinc, so highly spoken of in the *Mechanics' Magazine*, vol. xx. Mr. Trubshaw (p. 47.) and myself were engaged, simultaneously and without concert, in righting leaning towers, about two years ago. Mr. Ranger's stone (p. 47.) reminds me of your enquiries respecting Brunel's marvellous arch in the Tunnel yard: perhaps you can get at it now. My mother used to steam dumplings, near thirty years since, with an apparatus like that of Mackenzie. (p. 48.) — *W. T. Norwich, March* 15. 1834.

The Architectural Magazine, and Architecture as a Study for Ladies. — I rejoice in anticipation of the happy results which must inevitably follow the circulation of your Magazine. The *Encyclopædia of Architecture* has done much towards improving the taste for architecture, and creating a desire for a more extensive acquaintance with its principles and practice; but the information conveyed by the pages of the Architectural Magazine is presented in such an inviting form, as to render it more generally useful, and better calculated to accomplish the design of its conductor: it being a book not intended for the study merely, but for the table of every one who has the least pretension to taste, or who has any feeling for the higher enjoyments of domestic

life. The Magazine will consequently become an able auxiliary in the cause of education; and hence it is I anticipate so much; for now (and not till now have they been able) will our females make architecture their study. It is my decided opinion, and I have frequently expressed it, that neither architecture, nor the fine arts generally, will flourish in this country, till they become branches of female education; and I would suggest that you should write an article, expressly dedicated to females, for the purpose of calling their attention to this very important subject, and that you should lose no opportunity of impressing on them, as they value their own happiness and that of their children, the necessity of the study of architecture. Then would follow, as a necessary consequence, the fine arts, landscape-gardening, floriculture, horticulture, &c., and our ladies would become active, healthy, intelligent, and happy; and would diffuse those blessings to all around them. — *John Price, Architect. Derby, June* 21. 1834.

Art. V. *Queries and Answers.*

Inconvenience of lofty Windows. — My upper windows here are 8 ft. high, and the upper sashes are fixed; the stonework projects a good deal; so that I tremble every time they are cleaned: and how a glazier would contrive to put one of the topmost panes in I cannot tell. No ladder can be brought near enough; and a man standing on the sill of the window cannot reach 8 ft. high. An ordinary glazier's bench or stool is of no use in such a case as this. What is wanted is a raised platform, which may be easily fastened to the window, and shall, at the same time, have an upright shaft, by which a man may support himself. *Experto crede.* Make your windows less than 8 ft. high, or let the upper sashes be made to slide. A plank, supported on a trestle in the room, and tied to a ladder outside, which may also be taken hold of by the workmen, is all I can think of. Can any of your readers suggest a better plan? — *T. W. The Banks, Yorkshire,* 1833.

Sideboards for small Rooms. — I saw, some years since, a kind of dumb waiter, which would be very suitable for a small dining-room sideboard. It consists of three leaves, which, when not wanted, lie close together, and form a neat side-table: when wanted, the centre pillar is contrived so as to allow of their rising up, and forming three tiers of leaves. I have not a sufficiently accurate recollection of it to be able to send you a drawing; but I doubt not that Mr. Dalziel will recognise the description, and explain it to you: and I think you will agree with me in considering it a very clever and useful piece of furniture, where space is valuable. One of the most elegant, because most simple, sideboards, for a similar purpose, that I ever saw, was only a slab, partly screwed to the wall, and partly supported by two brackets, that were placed so as to include about one third of its length between them, which was fitted up with book-shelves, I think; but would have been more appropriately accompanied by a cupboard. If Mr. Dalziel, or any other of your correspondents, could give me a working-plan, &c., of the dumb-waiter sideboard, I should be much obliged. — *T. W.*

Washing and Wringing Machine. — Seeing a wringing machine figured in your *Encyclopædia of Cottage, Farm, and Villa Architecture and Furniture,* I send you an account of a washing and wringing machine which I have had in use for some years. It was made by Bullman of Leeds, who took out a patent for it, some years since. In mine, the operator, if only one, stands at the end opposite the wringing apparatus, and works the washer by means of a lever that plays from right to left: but, unfortunately, the maker never thought it necessary to consider that it would probably be worked by a woman; nay, it requires a span that is not very convenient to a tall man. An improvement has been made in these machines, by which the washer is worked by a person or persons at the sides, and moves along, not across, the machine. Bullman has also a mangle on the principle of the wringing machine. Perhaps some

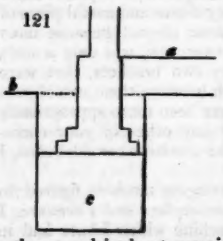
of your correspondents could favour us with a description of both machines. — *Lavator.*

Colouring of Plaster Casts. — Can any of your correspondents inform me what the colouring is composed of, and how it is used, on the plaster casts from the frieze of the Temple of Lysicrates, now in the new room at the British Museum? — *E. B. L. London, July 9.* 1834.

Composition of Concrete, for Foundations. (p. 216.) — In answer to Investigator, I have used concrete in the proportion of five of loamy gravel to one of stone lime. Dry brick rubbish may be used with the gravel; or, in fact, any other material, if carefully spread, and used sparingly. These proportions will be found to answer well. This kind of foundation is not very new; for Carter informs us that the foundations of Westminster Abbey, erected 1245, consist of flints, irregular stones, rubble, and mortar, forming together one almost impenetrable body. In many of the ancient remains of castles, particularly in Kent, the foundations are made in this manner. — *L. London, July 3.* 1834.

Concrete, &c. (p. 216.) — Take Thames-washed shingle, and Dorking lime fresh from the kiln and finely powdered, in the proportion of six bushels of shingle to one bushel of lime, with a due quantity of water. These are to be intimately and properly mixed in small quantities (say a small barrowful), and then thrown from a stage at least 5 ft. high, while hot, in equal layers; every layer to be well rammed. — *A Constant Reader. London, July 4.* 1834.

Concrete Foundations (p. 216.) are usually made with Dorking lime; but I apprehend any water lime will do as well. We use, for waterworks, lime burnt at Heyden in this county. There is also a capital lime made at Reach, and at Burwell, in Cambridgeshire, which is used in waterworks all over the Fen country: both these limes are sold at the kilns for about 6*d.* per imperial bushel. This is very important; for, with Dorking lime, concrete foundations cost nearly as much as brickwork, all things considered. With regard to the proportions of materials, I should advise experiments to be made with local materials, to determine them. Pieces might be formed of not less than a foot cube; or, what is better, an old tea chest might be filled with them. The lime should be fresh from the kiln. I believe concrete was first suggested by Semple, in his *Treatise on Building in Water;* 4to, 63 plates; Dublin, 1777. — *W. Thorold. Norwich, July 6.* 1834.

Concrete. (p. 216.) — Whenever I have used concrete in the foundation of buildings, I have had a wide square trench dug out, about 8 in. wider than the lowest course of brickwork, and to such a depth as to insure a tolerably firm foundation. *Fig.* 121. will show this more distinctly. In this figure, *a* is the floor line; *b*, the ground line; and *c*, the concrete. When the trench is made, I have coarse and fine gravel thrown into it together (just as they come from the pit), to a thickness of about 4 in.; I then have it grouted with thin hot lime, only just enough to bind the gravel together. The mixture must now be rammed down hard. Course after course must then be laid, and so treated; till the mass reaches to within about 18 in. of the ground line. The proportion of hot lime to the gravel is about one eighth part only, which I think is enough. It was Walter's Sutton flare-burnt lime which I used. I think this plan better than first mixing the gravel and lime, but this may be a mere matter of opinion. The mixture hardens in a few days, in the most complete manner. After the brickwork is built on it, immediately fill the sides of the trench with earth, ramming it in well, to prevent the rain from affecting the concrete. — *J. B. Watson.* 30. *Duke Street, Manchester Square, July 9.* 1834.

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